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James D. Tansey and Michael Burgess

Risk researchers have traditionally examined technologies that have become stigmatized in the public realm. In this study, we examine a prior cognitive phenomenon, which assumes that technologies are classified according to the non-scientific taxonomies that individuals use to make sense of the world. We describe the coarse taxonomies revealed during five focus groups involving expert and non-expert participants. The study suggests that in discussions of salmon genomics, participants consistently conflate genomic research with transgenic applications. The authors discuss the implications of this phenomenon for public policy.

1. Introduction

In recent years, genetic sciences have been at the center of a number of controversies. The controversies emerge when genetic sciences "spin off" research findings that are transformed into commercial products (Wynne, 2001; Giles, 2003; Jayaraman, 2003; Hopkin, 2004; Jacoby, 2004) or where the basic research itself reignites existing controversies, as in the case of stem cell research[1] (Holland et al., 2001).

Researchers in the field of risk argue that technologies can become stigmatized as a result of public controversies (Flynn et al., 2001; Gregory and Satterfield, 2002) and that this stigma applies not just to the specific geographic or institutional context where a controversy occurs, but, in some cases, to other similar examples of that technology. In essence, the controversial technology becomes the exemplar for a class of troubled technologies. In perhaps the most dramatic example of this phenomenon, a catastrophic event in one nuclear power station (Chernobyl) resulted in the (further) stigmatization of all nuclear power stations and other forms of nuclear power generation. The extent of the stigma depends on the degree to which other related technologies are considered by the audience to be in the same class as the offending technology.

In this paper, we examine the subtle cognitive phenomenon that is a precursor to the possible stigmatization of technologies that occupy a shared general class but have distinct characteristics. The general class of technologies examined in this paper is genetic research.[2] Within this general class of research, we are interested in salmon genomics and the extent to which this research is recognized by stakeholder groups as distinct from transgenic applications that directly seek to modify

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the genes of living organisms. Analogues for this cognitive phenomenon can be found in psychological and anthropological literature (Gil-White, 2001; Atran et al., 2002). Anthropologists have studied the folk ecologies of indigenous people in order to map out the classificatory schemes used to organize animals in the living world into coherent groups. Douglas describes how Jewish dietary law classifies animals physiologically, according to how they chew the cud and whether their hooves are cloven. She also described how the Lele of Kasai classified animals by the spaces they inhabited: birds, monkeys and squirrels were all classified as "sky creatures" (Douglas, 1999: 272). In the discourse of contemporary culture of anti-whaling protest, a "super whale" emerges with the characteristics of a number of species that suggest the animals have human traits are "lumped together" (Kalland, 2002, in Lien, 2004: 186). This process of reclassification has powerful political implications in the struggle to protect whales; whether it is scientifically correct or not is irrelevant to the power and authority of the super whale.

In this study, we are interested in the "intuitive taxonomies"[3] of scientific practices in heterogeneous focus groups in an industrial country. To be quite clear at the outset, our goal is not to identify right and wrong taxonomies, but rather to examine the range of classifications used to describe these scientific practices.

This approach is consistent with a number of recent studies. While a large number of studies have used survey instruments to examine stabilized attitudes to genetics (Massarani and de Castro Moreira, 2005; Bauer and Gaskell, 2002), others have pursued a more organic approach. A New Zealand study of the "social reception" of genetics used Bakhtin's concepts of chronotypes, to map out the temporal and spatial dimensions of clusters of public discourses related to genetics using focus group methods (Coyle and Fairweather, 2005). Similarly, Bates (2005) uses focus groups to examine how public culture informs and interacts with participants' views about genetics. In the process of establishing the context for his paper, Bates found evidence of the conflation of brain stem research with stem cell research in popular culture. In this study, we followed the more organic precedent and sought to identify and cluster the various meanings of genomics that emerged from five focus groups.

Genomics is a relatively new discipline. Devoted to the study of genes and their function in a wide range of organisms, genomic research is considered a basic life science that focuses on mapping segments of the DNA of various organisms and on studying the function of genes in living organisms.

Two examples of research supported by Genome British Columbia[4] illustrate the scientific practices encompassed by the term "genomics." The Genomics Research on Atlantic Salmon Project (GRASP) seeks to map the DNA of the Atlantic salmon (*Salmo salar*) on a coarse scale in order to produce what is known as a "BAC contig map,"[5] an essential step to mapping the entire DNA of any organism. The team has also studied specific areas of the genome that are important to phenotypic characteristics such as sex and immune response.

The second example is Microbial Envirogenomics: Micro-organisms and their Interaction with the Environment. This project is studying the *Rhodococcus* microbe (RHA 1) and its interaction with the environment. The study of gene–environment interactions is an important area of research, classified under the sub-discipline "envirogenomics."

Anecdotal interactions with researchers[6] involved in GRASP revealed a concern that their research, which seeks to deepen scientific understanding of the role and function of the salmon genome be distinguished from research into genetic modification of salmon. These researchers were acutely aware that controversies surrounding genetic modification, particularly of agricultural species such as canola and soy, might tarnish perceptions of their work.

In this study,[7] we examine how participants in five focus groups classify and understand salmon genomics. The focus groups were convened to reveal a broad range of the hopes and

concerns related to salmon genomics but the analysis in this paper focuses on just those sections of the focus groups where definitional issues were discussed.[8]

2. Study design

The study design involved five focus groups composed of participants drawn from similar backgrounds.[9] These groups of participants were organized into two segments. The first segment was composed of two groups (Random1 and Random2) who were randomly recruited by a professional firm using random digit dialing. This process necessarily involves some self-selection on the part of participants and while there was some screening of the participants by ethnicity, age and gender, we do not claim that the groups are representative of the population at large. The screening process also helped us to identify individuals with no expressed interest in the topic of salmon genomics.

The second segment recruited "expert," or what we prefer to call "interested" participants, who have a direct professional interest in the area of salmon genomics. They were recruited using targeted research into relevant organizations and by soliciting recommendations from individuals known to the research team. The first of the three groups in segment two was made up of individuals recruited from a mix of non-governmental organizations (NGOs). The second group was made up of individuals who work for funding organizations and researchers directly involved in salmon genomics (Fund/Res). The third group was composed of academics and regulators (Reg/Acad) with a direct professional connection to salmon genomics. None of the participants in the first segment knew each other. Participants in the second segment were often familiar to each other, but they were not drawn from a stable group. Sampling in two segments exposed us to a range of views from the interested parties, and also allowed us to tap into some of the more general public discourses around genomics.[10] The groups were gender balanced as far as possible and, as Table 1 shows, the participants covered a reasonable age spectrum. Table 2 indicates that our participants were drawn from fairly diverse ethnic backgrounds. More detailed reporting of demographics by group is not possible because three of the groups were drawn from experts who could likely be identified if we provided more information.

The focus groups were held in late 2003 and early 2004 in Vancouver Canada; each ran for two hours in the evening. Public participants were offered a $50 incentive, participants from NGOs were given the option to donate the money to an organization of their choice and other participants had a meal provided. The groups were organized, coordinated and implemented by a professional company with a strong reputation for managing and implementing focus groups. The moderators led the discussion and intervened to ensure that all participants had an opportunity to speak.

Table 1. Age of participants

Age (years)	Number of participants
Under 20	1
20–29	8
30–39	11
40–49	11
50–59	7
Total	38

Table 2. Ethnic background of participants

Ethnicity	Number of participants
Iran	2
Japan	2
Korea	2
India	3
UK	4
China	4
Other non-North American	5
Europe	8
Canada	8
Total	38

Consistency between the information the groups received was achieved through the use of a moderator's guide.[11] The participants were asked to introduce themselves to the group and then they were asked to describe "top of mind" responses to the following question:

> *I'd like you to tell me the top of mind things that come to mind when I say the term "salmon genomics" or "salmon aquaculture."*

The analysis in this paper focuses on direct responses of participants to the first half of this question: the meaning of salmon genomics. At no stage in any of the focus group sessions did the facilitators mention genetic modification of salmon or transgenic salmon. The analysis below is based only on the direct responses of the focus group participants to this question. On the basis of anecdotal evidence, we expected that the members of the public would conflate salmon genomics with the development of transgenic salmon,[12] but that the interested groups would be more likely to make a distinction.

Coding

The focus group discussions were recorded and transcribed. The coding reported below was based on a close reading of the transcripts to ensure that the participants were describing their own definitions of salmon genomics and were responding directly to the question posed by the moderator. Ambiguous responses were excluded from the analysis. Coding and analysis was completed using QSR N6, a qualitative data analysis tool.

Coding was initially completed by one of the two facilitators involved in the focus groups and was reviewed by one of the authors (Tansey) for consistency. The quotes included in the analysis below were selected to be representative of the general code. Participants in the focus groups were sent short summaries of the key findings of the focus group for comment.

3. Results

In this analysis, we focus on direct responses to the question posed above. These answers were described in 12 codes clustered under the parent code "Awareness of salmon genomics." The distribution of the codes across the groups is summarized in Table 3 later. Where quotes are used below, individual participants are referred to with the letter "V" and a numerator while the moderator's intervention is coded "M."

The "Manipulation of nature" code is of primary importance to this analysis. The code refers to "toying with nature" or human intervention in the genomes of natural organisms. In the words of a participant in the Fund/Res group: "Well, I come from a different slant. To me immediately it is manipulation, that's what I think of" (V3).

Genomics was also understood as "cloning" by participants in the Random2 group. Discussions of the implications of cloning were interesting. One participant considered that cloning might truncate the lifecycle of the salmon so fewer individuals are lost traveling up rivers to spawn. Another participant argued that cloning of salmon or cockroaches is likely to be more acceptable because they are less sentient animals, while cloned sheep create a controversy. The conclusion is that it is not clear that the conflation of genomics with cloning necessarily implies that the technology is viewed negatively.

The NGO group also conflated genomics with modification of native Pacific species and Atlantic salmon:

> My concern is that they're not only farming Atlantics, that they're farming Chinook and Coho, and I'm concerned about the manipulation of their genes, and those salmon escaping and breeding with wild stock. (V4)

In contrast, another participant recognized that one application of genomics was to study changes in the genetic diversity of wild stocks and the effect of external factors on salmon. The participant mentioned a specific study where researchers were examining the causes of phenotypic changes in Atlantic salmon.

> Well, I do have, yeah, I do have—the [name removed] recently did a study where they were examining some Atlantics that commercial fishermen had turned in, and they seemed to have undergone some kind of genetic alteration in that they're losing their spots on the gill plates, which is one of the defining features that really makes them stand out as being an Atlantic, and that's a concern of sports fishermen wondering why that is. (V1)

Researchers and funders in the Fund/Res group also immediately jumped from salmon genomics to talk about "Frankenfish" and genetic manipulation of salmon.

> Well, there's always the issue of the spectre of so-called Frankenfish, you know. I hate to use the word but it's been bandied around a lot and it's, you know, much overblown, you know, but I think it's important … (V1)

Even in the case of the code "Manipulation of nature," participants began to define the meaning of salmon genomics in terms of the commercial or technological applications of the knowledge generated by the research. This tendency was repeated throughout the remaining codes: the question about the meaning of salmon genomics (see above) was answered with statements about technological applications of the knowledge and a range of broader implications.

The code "Salmon as food source" describes responses where the focus was on the role of genomics in the commercial production of salmon. Participants in the two random groups (public) discussed the role of genomics in maximizing fish yields, although they did not explicitly describe this goal as being achieved through genetic modification. Discussions under this code quickly became much broader than genomics; participants raised issues such as security of the food supply and the application of agricultural practices to fish production.

V4 Well, just basically the whole idea of farming is to increase the food supply.
M Okay. All right. Anything else?
V7 How about a long-term preservation of a food source?

In the code "Profit," both the public (Random1) and the Fund/Res groups mentioned an issue closely related to the previous code: genomics is linked directly to profit through the commercial use of genomic information. A participant in the Fund/Res group argued that genomics and aquaculture are really about the use of power and wealth rather than the technologies themselves:

V4 I mean the controversy is about power and wealth.
M Okay.
V4 Not—
V2 Not the industry.

In a closely related code, participants argued that genomics could be understood in terms of applications that may produce economic benefits in general. A respondent in the NGO group had a broader take on the meaning of genomics, jumping immediately to the commercial implications of modification and arguing that the lower cost of farmed salmon, due to increases in the volume of production, would ultimately devalue wild stocks:

> I guess I'm concerned that aquaculture and the mass production of farmed Atlantic salmon is going to make wild salmon less valuable and therefore less worthy of conservation. (V3)

In a third related code, a respondent raised concern about the extent to which this research would result in the "Privatization of a common good." The common good in question is the world's oceans; the participant felt that expansion of aquaculture would result in the same enclosure process as occurred during the expansion of agriculture.

Participants were unsure, in some cases, of their interpretation of genomics. A comment under the code "Fish escapement" is a good example:

*M For profit, okay. Any other ideas, ones that you've heard people talking about?
V1 Yes, escaping. Escaping salmon. And I'm not sure if it's in the genomics as such.

An NGO respondent moved from the question about the meaning of salmon genomics to the modification of native Pacific salmon species and to the effect if they were to escape and outbreed with wild stocks (coded as "Impacts on wild salmon"). A similar concern was raised in Reg/Acad about how escaped Atlantic salmon might interact with wild species.

For some respondents it is not simply the nature of the changes derived from genetic sciences that matter, but also the rate at which change occurs. Under the code "Rate of change" respondents in the Fund/Res group raised concerns about new technologies that are appearing so quickly that no one in the industry fully understands their implications:

> The other thing too is the rapid pace in which this science is becoming common. It's all happening in a lifetime. The whole business—in fact even less than a lifetime. It's a great influx to comprehend if people aren't—even people who are in the industry and are close to it probably have difficulty in fully comprehending it. (V2)

Another participant in this group argued that while we have been modifying genes for thousands of years through breeding programs, the rate of change in recent years has been much quicker (also coded as "Rate of change"). This is a concern because genetic research can result in large-scale changes to species, in contrast to the "piecemeal" changes that occurred through breeding programs. Again, the Reg/Acad group emphasized that genomics may also just involve research that seeks to develop methods that distinguish between farmed stocks and "what is left of the wild stocks"; the kind of genomic research conducted by the GRASP group described above.

Across all of the focus groups, respondents repeatedly jumped from the meaning of genomics to the social and environmental implications. For instance, one respondent jumped from salmon genomics to the expansion of salmon aquaculture in Alaska, Japan, China and Korea and argued that these industrial fishing systems exceed the carrying capacity of the system:

> When you overproduce beyond the carrying capacity of a system, I don't care whether you call it ocean ranching or whatever, it's aquaculture and you're altering the genetics and the behaviour of the stock by doing it. (V1)

Participants in the same group (NGO) also raised the possibility that the nature and scale of salmon farming operations was altering the "genetic make-up" of salmon species.

Participants in the expert focus groups (although not in the two random groups) commented on the lack of public understanding of salmon genomics, a function of the complexity of the field as one participant in the Fund/Res group points out:

> And even when I was trying to be educated into the whole area of genomics, even with the so-called science background I have, I had difficulty understanding it. I'm sure that the public who has no feel for it at all is going to have difficulty as well. (V2)

Comments (coded as "Lack of public knowledge") highlighted, among other things, the lack of understanding of the distinction between salmon species, once again using the example of the Atlantic salmon. This NGO respondent suggested that because Atlantic salmon is a trout, it will not be able to cross-breed with native Pacific species.[13] Participants in the Fund/Res group commented in general terms on the lack of public understanding of genomics and aquaculture and the Reg/Acad group discussed the fact that the complexity of the science involved meant that both sides in the argument could "create spin."

Finally, participants associated genomics with a broader range of issues under the code "Miscellaneous." In the first case, genomics is described as "trendy" and consequently risky. In the second case, a participant responded to a question about the meaning of genomics by raising questions about whether it is appropriate to use public funds for the development of commercial applications of technology. Finally, a participant in the Reg/Acad group suggested there was a distinction between the technical definition of genomics and the public's perception of the field.

While the section above provides a summary of the nature of the concerns raised by participants, Table 3 provides a summary of the distribution of these codes across the five groups. The unit of measurement is the number of times a relevant "text unit" appears in each document. QSR N6 breaks transcripts into user-defined text units for the purpose of analysis. In this case the text units were "lines," typically a spoken sentence. The number of text units in Table 3 reflects the number of lines in which the code appears.

There are not systematic trends in the distribution of codes between the interested participants and the public: both segments conflate salmon genomics with manipulation. The one exception is the Reg/Acad group. Examining this focus group in more detail, a number of "meanings of genomics" emerge. Some are simply characterizations of the field reflecting the scale of the activities encompassed by genomics. Another participant immediately reflects on the complexity of the issue and on the extent to which this complexity allows interest groups on both sides to promote their own interpretation of salmon genomics:

> For me the science is sort of beyond the understanding of most people in the public at this point, and that the spin or the portrayal of the issue by certain interest groups on both sides, I guess, are creating a lot of confusion in the public. (V5)

From there, the discussion moves through the use of public funds and to the potential benefits of genomics.[14]

Table 3. Distribution of codes across groups

Group	Manipulation of nature	Salmon as food source	Profit	Fish escapement	Rate of change	Costs/ economics
Random1	6	3	1	1	0	0
Random2	3	9	0	1	0	3
NGO	8	0	0	1	0	0
Fund/Res	10	10	11	0	10	3
Reg Acad	0	0	0	1	0	3

Group	Impacts on wild salmon	Other environmental concerns	Lack of public knowledge	First Nations interests	Privatization of a common good	Miscellaneous comments
Random1	0	0	0	0	0	0
Random2	5	6	0	0	0	1
NGO	5	1	1	4	0	0
Fund/Res	0	0	3	0	6	0
Reg Acad	0	0	3	0	0	8

4. Discussion

With one exception (the Reg/Acad group), all of the focus groups conflated salmon genomics with modification, cloning or genetic manipulation. In most cases, this became the most commonly discussed theme in the early part of the focus group. It is also striking that the meaning of genomics was described in terms of the applications for which new knowledge would be used and the broader implications of those applications. In addition, it is important to note that conflation of genomics with transgenics does not necessarily imply that stigmatization will occur, since all the groups were able to identify positive and socially beneficial applications.

It is difficult to determine the reasons for the conflation using the data available. The most likely explanation is that knowledge of genetic sciences demonstrated in the focus groups draws on understanding that is implicit in the focus groups or established prior to the groups. Influences on this understanding probably include mainstream media coverage, the majority of which has focused on transgenic applications. The moderator's framing of the questions—requesting top of the head responses to "salmon genomics or salmon aquaculture"—might have encouraged consideration of salmon genomics in aquaculture.

If, owing to framing and/or media presentations, "genetic sciences" is thought of as the major class of research then genomics and research into transgenic species might be considered to be related subclasses. Our suspicion that experts would be more likely to recognize the distinction between genomics and transgenic research is only partially proven. The focus group composed of regulators and academics recognized the difference, but the NGO and Fund/Res groups both conflated the two classes.

What is also striking from the focus groups as a whole is that the participants were comfortable with the ambiguity of the central topic of discussion. When participants sought clarification it was in cases where it was unclear whether the moderator was referring to salmon genomics or aquaculture. This paper suggests that both interested and lay participants draw on general heuristics from the popular media or other sources, to make sense of what may be an unfamiliar concept. A more generous interpretation would suggest that participants feel that the distinction between basic research, in the form of salmon genomics, and applications to aquaculture, particularly through the potential to modify salmon, is a fuzzy one. The data

available do not provide sufficient detail to support a deeper analysis of the reasons for the conflation of the two subclasses. Finally, one can speculate that the focus groups might create a context in which the participants feel uncomfortable asking for direct clarification about the topic of discussion.[15]

Conclusions

The purpose of the focus groups was to reveal the diversity of meanings of salmon genomics across the groups we assembled. The goal was not to capture a statistically representative account of a population's perceptions. Although politically powerful, consensus or majority opinion does not independently establish the ethical justifiability of a view. These focus groups are part of a research program examining the benefits of introducing a wider range of voices into ethical analysis and public debate about the appropriateness of a novel technology and set of scientific practices.

The dilemma that results from the identification of an ambiguous understanding of the scope of a topic is pervasive in consultation. In order to respect the integrity of the views of the participants, their views are taken as given; in this case the research team made an explicit decision not to "skill up" the participants by offering extensive background materials in advance of the focus group. This decision respects and seeks to capture the knowledge base and competence the participants bring to the group discussion and it takes their "meanings" seriously.

Critics might argue that raising the competence of participants is an important goal, necessary so that decisions can be made on a more informed basis. However, this raises questions about whether the values implicit in technical information and the cultural authority of experts undermine participants' reporting of their concerns. Moreover, since the goal of the consultation was to describe the diverse views held by participants, then the case for taking knowledge prior to expert clarification but informed by popular heuristics is stronger.[16] In this case, the participants may more accurately reflect how sub-populations might react to policy decisions or in a public debate about salmon genomics.

Conversely, the persistent conflation of salmon genomic research and transgenics could be used as a justification for more intense science education. Since genomic research activities and genetic modification are distinct activities, it seems that clear discussion of their respective risks might begin with clearly distinguishing between the two. Failing to do so appears to be a serious limitation to public input, since genome research will be held accountable for risks of genetic modification, and genome researchers do not necessarily intend for their research to result in genetic modification. Clarity about the differences between genome research and genetic modification could avoid the "stigmatization by association" described at the outset of this paper.

There are problems with this educational approach. While it is possible to envisage small-scale interventions, which educate the public (see for instance the "Deliberative Polling" approach developed by Ackerman and Fishkin (2004) and others), it is very difficult to envisage how large-scale social education programs could be financed or implemented. In other areas of science communication and risk perception research related to technologies such as nuclear power the general conclusion is that decision makers have to accept that enduring risk "perceptions" should be treated as real (Slovic, 1987). This dilemma is magnified in the face of arguments that suggest that the public should be engaged early in the development of research programs: "upstream" engagement should direct the downstream investment of resources (Wilsdon and Willis, 2004; Wynne, 2004). Ultimately a great deal depends on the context within which public engagement is sought. If the goal is to inform

a wider decision-making process, then the argument for taking non-scientific taxonomies seriously is stronger, since they will ultimately inform the perception of the technology in question. If the goal is to directly determine a decision—analogous to the role of citizen participation in jury service—the argument that the process should involve informed deliberation is stronger.

We conclude by noting a paradox relevant to these findings that results from the organization of commercial and scientific enterprises in modern industrial societies. To some degree, the political struggle to attract funding for major funding regimes in the sciences (consider for instance James Watson's lengthy efforts to lobby US Congress for funding for the Human Genome Project) relies on the deliberate conflation of a range of technologies to create a bundle that is attractive to decision makers. The most recent example is the emergence of a funding regime to support nanotechnology, which bundles together a vast range of science projects from physics, chemistry and the biosciences and emphasizes the radical impacts it could have on society. This "bundling" of technologies is necessary to generate the political attention and capital to support these long-term research efforts but it also creates a risk that controversies associated with one member of the class will pollute and stigmatize other technologies in the class. Given the range of technologies bundled under the label "nanotechnology," this is surely an issue of concern to the organizations involved in the commercialization of these products.

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Notes

1 The status of an embryo is perhaps the most divisive and volatile issue in American domestic politics. The controversy over stem cell research in the US results from the fact that currently the stem cells used in research are derived from embryos in the early stages of development (which have to be destroyed to extract stem cells) and the gonadal ridge of an aborted fetus.

2 Although genomics is used to distinguish the contributions of the genome from those of "single gene" mutations, we use the more common language convention, in which "genetics" refers to the wider field including genomics.

3 The phrase is used by Atran et al. and by Gil-White.

4 Funding for this research was provided by Genome Canada and Genome British Columbia. We have drawn on examples we became familiar with in the course of our interactions with the two organizations simply to illustrate the range of research under way in this field.

5 BAC (Bacterial Artificial Chromosome) contigs (from contiguous) are used to sequence genetic code in genomics projects. A short piece of DNA is amplified and sequenced in a BAC.

6 These interactions included various discussions with Genome BC officials, as well as comments from genome researchers.

7 "Democracy, Ethics and Genomics: Consultation, Deliberation and Modelling" is funded in part by Genome Canada and Genome BC to evaluate the usefulness of different forms of ethical analysis for assessing the moral weight of public opinion in the governance of genomics. This paper is based on a subset of focus groups in one of the consultation exercises. The project and working papers are available at http://gels.ubc.ca

8 One anonymous reviewer asked how group dynamics affected the formulation of responses. The central question was posed very early in the focus group as an introductory exercise, so there was no real group participation in the formulation of responses.

9 Ethics approval for this research was secured through the research ethics board of the University of British Columbia.

10 Random, as opposed to what one reviewer described as purposeful, sampling does introduce some limitations. Establishing new groups instead of tapping into established groups involves very different interpersonal dynamics. Our goal was to introduce greater diversity, but we do not claim to have been exhaustive or representative.

11 Ethics approval was received from the University of British Columbia's Behavioural Research Ethics Board.

12 To date, no transgenic salmon have been approved for commercial production. One application is currently under review by the US Food and Drug Administration. Research laboratories have created transgenic salmon for research purposes and the findings of one study were recently reported.
13 Atlantic salmon are within the genus *Salmo* while the seven species of Pacific salmon are in the species *Oncorhynchus*. The respondent is correct in that Atlantic salmon share this genus with Brown trout. It is widely accepted that the two species cannot interbreed.
14 These sections were coded under miscellaneous comments, since they were non-specific.
15 The opposite, or some intermediate account may also be true. The need to follow the conversation might actually encourage participants to seek clarification of the scope or direction of a discussion; pressure to avoid revisiting topics and move on might discourage seeking such clarification.
16 This justification is buttressed by the concern that participants be uninhibited in their identification of hopes and concerns related to genomic research. Beginning by correcting their notions of genomic research would have encouraged self-monitoring that might have inhibited the range of interests participants would discuss.

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